Claims

[c1] 1. A superconducting magnet support structure comprising:
an exterior portion comprising a plurality of shoulders and a plurality of pockets wherein said plurality of shoulders and said plurality of pockets are dimensioned to receive a superconducting magnet;
an interior portion comprising a base coupled to said plurality of shoulders; and
said exterior portion and said interior portion comprising roving at approximately 0 ° and 90 ° directions relative to a center axis extending through the superconducting magnet support structure.

[c2] 2. A support structure as in claim 1 comprising a plurality of overlapped fiberglass tape strips containing said roving.

[c3] 3. A support structure as in claim 2 wherein said plurality of overlapped fiberglass tape strips overlap each other approximately 50%.

[c4] 4. A support structure as in claim 1 wherein said plurality of shoulders comprise a plurality of overlapped fiberglass tape strips that overlap each other approximately 100%, over said base.

[c5] 5. A support structure as in claim 1 wherein said base is of uniform thickness.

[c6] 6. A support structure as in claim 1 wherein the support structure comprises tape containing said roving.

[c7] 7. A support structure as in claim 6 wherein said tape comprises non-woven cloth.

[c8] 8. A support structure as in claim 1 wherein the support structure comprises a plurality of tape strips, each of said strips being approximately four inches wide.

[c9] 9. A support structure as in claim 1 wherein the support structure comprises a plurality of tape strips comprising one or more layers.

[c10] 10. A support structure as in claim 1 wherein the support structure comprises:
a first layer comprising roving at approximately 0 ° relative to said center axis;

a second layer coupled to said first layer and comprising roving at approximately 90 ° relative to said center axis; and
a third layer coupled to said second layer and comprising roving at approximately 90 ° relative to said center axis.

[c11] 11. A support structure as in claim 10 wherein said first layer, said second layer, and said third layer are coupled by either stitching or resin.

[c12] 12. A method of fabricating a superconducting magnet support structure comprising:
providing preformed support tooling dimensioned according to design criteria for the superconducting magnet;
designing a preformed support tooling for the superconducting magnet coil support structure and generating design criteria;
applying an integrated multi-layer glass tape to said preformed support tooling by a wet winding process;
thereafter, curing said multi-layer glass tape;
machining said cured multi-layer glass tape; and
removing said preformed support tooling.

[c13] 13. A method as in claim 1 wherein 12 wherein applying an integrated multi-layer glass tape comprises applying roving to said preformed support tooling at approximately 0 ° and 90 ° directions relative to a center axis extending through the resulting superconducting magnet support structure.

[c14] 14. A method as in claim 12 wherein the step of providing said preformed support tooling comprises:
determining dimensions of the superconducting magnet;
determining dimensions of space available for said superconducting magnet coil support structure;
determining a mounting configuration of said superconducting magnet coil support structure;
designing dimensions of said superconducting magnet coil support structure to accommodate for said dimensions of said superconducting magnet, said dimensions of space available, and said mounting configuration; and

designing dimensions of said preformed support tooling to accommodate said designing dimensions of said superconducting magnet coil support structure.

[c15] 15. A method as in claim 12 wherein the step of performing a wet winding process comprises:
feeding a dry tape through a delivery system;
applying resin to said tape at a predetermined rate; and
winding said tape onto said preformed support tooling.

[c16] 16. A method as in claim 12 wherein said wet winding process is computer controlled.

[c17] 17. A method as in claim 12 wherein applying an integrated multi-layer glass tape comprises overlapping a plurality of fiberglass tape strips.

[c18] 18. A method as in claim 12 wherein applying an integrated multi-layer glass tape comprises varying the width of said integrated multi-layer glass tape.

[c19] 19. A method as in claim 12 wherein applying an integrated multi-layer glass tape comprises varying at least one of the following: roving material weight, overlap percentage, winding tension, and resin soak time.

[c20] 20. A superconducting magnet coil support structure formed according to the method of claim 12.